

### **Abstract**

A video gaming machine simulates a real physical game, such as pachinko, by providing a mathematical model of the game including rules governing movement of an object placed in motion in accordance with a set of initial conditions. A pay table for the game is developed by creating a list of outcomes, assigning a probability of occurrence to each outcome, assigning a win amount to each outcome, and determining a pay table percentage by multiplying each outcome's probability of occurrence by its win amount and summing the products for all of the outcomes in the list. Creation of the list of outcomes and assignment of probabilities of occurrence may be effected by a Monte Carlo test. The game is played by randomly selecting a set of initial conditions and running them through the model. Alternatively, each route that the object may take can be broken down into a plurality of route segments or paths, each play of the game consisting of a chain of several paths respectively initiated by changes in direction of the object, such as by obstructions in the play field. Another option is to run the model backward from a desired outcome to a starting condition and then run the model forward from the starting condition.

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